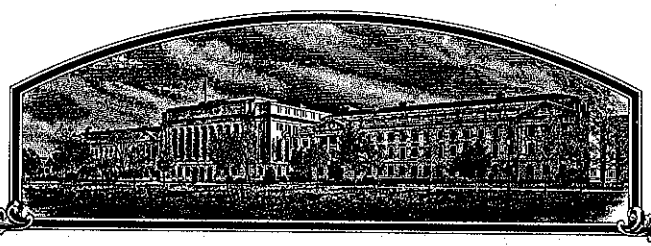


No. 9300073

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Minnesota Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'Norm'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D.C. *this* 29th *day of* December *in the year of our Lord one thousand nine hundred and* ninety-five.

Attest:

Marshall A. Stanton
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Dan Glickman
Secretary of Agriculture

FORM APPROVED: OMB 0581-0055, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
Minnesota Agricultural Experiment Station

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.
MN85324

3. VARIETY NAME
Norm

4. ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*
University of Minnesota
220 Coffey Hall
1420 Eckles Avenue
St. Paul, MN 55108

5. PHONE *(Include area code)*
612-625-4211

FOR OFFICIAL USE ONLY

PVPO NUMBER
9300073

FILING Date: January 7, 1993
Time: 2:45 ☐ A.M. ☒ P.M.

FEES RECEIVED
Filing and Examination Fee: $ 2150.00
Date: January 7, 1993
Certificate Fee: $ 250.00
Date: NOVEMBER 13, 199[illegible]

6. GENUS AND SPECIES NAME
Triticum aestivum L.

7. FAMILY NAME *(Botanical)*
Graminecia

8. CROP KIND NAME *(Common Name)*
Hard red spring wheat

9. DATE OF DETERMINATION
February 15, 1992

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Minnesota Agricultural Experiment Station

11. IF INCORPORATED, GIVE STATE OF INCORPORATION

12. DATE OF INCORPORATION

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Robert H. Busch
USDA-ARS-MWA, PSRU, University of Minnesota, 411 Borlaug Hall, 1991 Upper Buford Circle
St. Paul, MN 55108
PHONE *(Include area code)*: 612-625-1975

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*
- a. ☒ Exhibit A, Origin and Breeding History of the Variety.
- b. ☒ Exhibit B, Novelty Statement.
- c. ☒ Exhibit C, Objective Description of Variety.
- d. ☒ Exhibit D, Additional Description of Variety.
- e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office 12/31/92
- g. ☒ Filing and Examination Fee ($2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act.)*
☒ YES *(If "YES," answer items 16 and 17 below)* ☐ NO *(If "NO," skip to item 18 below)*

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES *(If "YES," through* ☐ Plant Variety Protection Act ☐ Patent Act. Give date: _____ .)
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates)
☒ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Robert H. Busch	Adjunct Professor	January 5, 1993
SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Michael Martin	Assistant Director	January 5, 1993

HARD RED SPRING WHEAT
Wheat Variety 'NORM' PI562700

14A. Exhibit A

Pedigree MN73167/MN81070

MN73167 ('Flr'/'Bj66'//'Era'/3/'Crim'/2*Era)/
MN81070 (Era/'Kitt'/3/Flr/'Cno67'//CI13569/4/
II-60-46/5/'Wdr'/Era/6/Flr/Bj66/Era/3/Crim/2*Era)

The cross of MN73167, an elite Minnesota breeding line, closely related to 'Wheaton' and MN81070, an elite Minnesota breeding line with high bread-making quality, was made under the direction of Dr. R. Busch in 1982. The F_2 was selected under rust (leaf and stem) conditions for resistance, plant height, maturity, and generally desirable appearance. The F_3 and F_4 were advanced using single seed descent in the greenhouse, fall 1983 and spring 1984, with no selection except for plant height. The F_5 was selected on a row basis for appearance, plant height, maturity, tolerance to black chaff, and for leaf and stem rust resistance in inoculated rust conditions. Norm originated from an F_5 head in 1984. It was increased as an F_6 head row in Weslaco, TX, winter of 1984-85, entered in preliminary yield trial as an F_7 in 1985 and designated as MN85324. MN85324 was tested in advanced trials in Minnesota from 1986 and in the Uniform Regional Hard Red Spring Wheat Performance Nursery as an F_9 line in 1988. Selection was continued each generation from the F_7 for leaf and stem rust resistance in an inoculated nursery, plant height, tolerance to foliar leaf diseases, lodging resistance, test weight, and bread-making quality. About 250 F_9 head rows were grown at Weslaco, TX, in the winter of 1988-89 for purification. About 220 phenotypically similar rows were bulked to form breeder's seed that was increased at St. Paul, MN in 1989. Norm has appeared stable and relatively uniform during our seed increase program after re-selection, except for about 1 in 10,000 tall plants.

Exhibit 14b. Novelty.

Morphologically **Norm** most closely resembles **Era**, **Wheaton** and **Marshall** compared to other hard red spring wheat cultivars grown in the upper midwestern USA. Dr. K. Khan, Department of Cereal Science, North Dakota State University, Fargo, ND 58105 at the request of Dr. R. Busch was asked to obtain clear and useful gels for cultivar identification. The procedure used is published (Khalil Khan, Richard Frohberg, Truman Olson, and Linda Huckle. 1989. Inheritance of Gluten Protein Components of high-protein hard red spring wheat lines derived from *Triticum turgidum* var. *dicoccoides*. Cereal Chem 66(5):397-401). Dr. Khan used PAGE gel electrophoresis to determine the gliadin fraction of the gluten protein. It is the end product of the cultivar's genetic constitution that produces the gliadin fractions. These gliadin bands are called genetic markers and are commonly used to discriminate among cultivars. They are not effected by environment, like many morphological traits which are phenotypic measures, and represent consistently repeatable genotypic differences.

Dr. R. Busch requested gliadin fractionation to provide genetic differentiation among the following varieties for Plant Variety Protection: Era, Norm, Wheaton, Norm, Marshall, Bergen, Spillman, Minnpro, Prospect and Vance. Figure 1 is the result of the PAGE gel electrophoresis and allows genetic differences to be observed among all the varieties named above. Norm is differentiated from Era by the lack of a band in Norm, possession of a band in Norm that Era lacks, an Era band that Norm lacks, and two bands in Norm that Era lacks (Fig. 1-1,2,3,4,5). Norm is distinguished from Wheaton primarily by the absence of a band in Norm that Wheaton possesses (Fig. 1-6). Norm is distinguishable from Marshall by the absence of bands 7 and 9 and the possession of bands 8, 10, and 11 (Fig. 1-7,8,9,10,11). Norm differentiates from Bergen by possessing bands 12, 13, 14, and 15 which Bergen lacks (Fig. 1-12,13,14,15). Norm possesses bands 16, 17, and 18 which Spillman lacks, but Spillman possesses band 19 which Norm lacks (Fig. 1-16,17,18,19). Norm possesses bands 20, 21, 22, and 23 which Minnpro lacks (Fig. 1-20,21,22,23). Norm possesses bands 24,25, 26, and 27 which Prospect lacks. Prospect also possesses several bands which Norm lacks which are not marked (Fig. 1-24,25,26,27). Norm possesses bands 28, 29, 30, and 31 which Vance lacks (Fig. 1-28,29,30,31). Although Spillman is a wheat variety released from Washington State Experiment Station, it was included because of questions arising with resemblance to other Minnesota developed wheat varieties. All wheat varieties are distinguishable uniquely from each other as well as from Norm using gliadin banding. This procedure is highly repeatable and provides excellent genetic discrimination among cultivars.

FORM APPROVED: OMB NO. 0581-0066

EXHIBIT C
(Wheat)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
COMMODITIES SCIENTIFIC SUPPORT DIVISION
BELTSVILLE, MARYLAND 20705

OBJECTIVE DESCRIPTION OF VARIETY

WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(s)
Minnesota Agricultural Experiment Station

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
University of Minnesota
220 Coffey Hall
1420 Eckles Avenue
St. Paul, MN 55108

FOR OFFICIAL USE ONLY

PVPO NUMBER
9300073

VARIETY NAME OR TEMPORARY DESIGNATION
Norm (MN85324)

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:

[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:

[1] 1 = SPRING 2 = WINTER 3 = OTHER (*Specify*) _____

[2] 1 = SOFT 2 = HARD 3 = OTHER (*Specify*) _____

[2] 1 = WHITE 2 = RED 3 = OTHER (*Specify*) _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

[6][0] FIRST FLOWERING

[6][4] LAST FLOWERING

4. MATURITY (*50% Flowering*):

[1] NO. OF DAYS *EARLIER* THAN .....

[3] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

[ ] NO. OF DAYS *LATER* THAN .....

5. PLANT HEIGHT (*From soil level to top of head*):

[0][7][6] CM. HIGH

[ ] CM. TALLER THAN .....

[1][1] CM. SHORTER THAN .....

[3] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (*See reverse*):

[2] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:

[1] 1 = YELLOW 2 = PURPLE

8. STEM:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom: 1 = ABSENT 2 = PRESENT

[1] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT

[1] Internodes: 1 = HOLLOW 2 = SOLID

[0][4] NO. OF NODES (*Originating from node above ground*)

[3][4] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:

[2] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____

[2] Flag leaf: 1 = NOT TWISTED 2 = TWISTED

[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT

[1][5] MM. LEAF WIDTH (*First leaf below flag leaf*)

[2][8] CM. LEAF LENGTH (*First leaf below flag leaf*):

9300073

11. HEAD:

[2] Density: 1 = LAX 2 = DENSE

[1] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) _____

[4] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[1] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER (Specify): _____

[0][8] CM. LENGTH

[1][3] MM. WIDTH

12. GLUMES AT MATURITY:

[1] Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.)

[1] Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.)

[4] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[3] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[1] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[2] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[1] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[ ] Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

[0][6] MM. LENGTH

[0][3] MM. WIDTH

[3][8] GM. PER 1000 SEEDS

17. SEED CREASE:

[2] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[2] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[2] STEM RUST (Races) Resistant to all prevalent races

[2] LEAF RUST (Races) ~~Lr13,Lr34,Lr16~~

[0] STRIPE RUST (Races) _____

[1] LOOSE SMUT

[0] POWDERY MILDEW

[0] BUNT

[ ] OTHER (Specify) _____

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY

[0] APHID (Bydv.)

[0] GREEN BUG

[0] CEREAL LEAF BEETLE

[ ] OTHER (Specify) _____

HESSIAN FLY RACES: [ ] GP [ ] A [ ] B [ ] C [ ] D [ ] E [ ] F [ ] G

RECEIVED USDA AMS JAN 7 1993 Plant Variety Protection Ofc.

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Era	Seed size	Marshall
Leaf size	Wheaton	Seed shape	Marshall
Leaf color	Marshall	Coleoptile elongation	Era
Leaf carriage	Marshall	Seedling pigmentation	Marshall

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

5

14D. Exhibit D. Additional description of '**Norm**'. Norm is a hard red spring wheat, *Triticum aestivum* L. Agronomic data on Norm and selected varieties averaged over 19 environments (years-1989, 1990,and 1992) is presented in Table 1. The LSD 0.05 for each trait is computed from the variety x environment interaction. Norm differs from Marshall, Era, Wheaton, Vance, Minnpro, and Bergen by having significantly higher test weight. Norm is significantly earlier than Marshall, Era, and Vance. Norm is also significantly taller than Marshall, Era, Wheaton, and Bergen.

Norm has been highly resistant to all tested races of stem rust (caused by *Puccinia graminis* Pers:Pers) both in the field nursery tests and in the greenhouse in seedling growth stage. Norm has also been resistant to all naturally occurring leaf rust (caused by *Puccinia reconditia* Rob. ex Desm.) races in adult field tests. Leaf rust race seedling tests of Norm indicated that it possesses Lr16 for seedling resistance. Norm has Lr13 and Lr34 adult plant leaf rust resistant genes, similar to Era, Wheaton, and Marshall but they do not possess Lr16.

Norm has short, narrow, white glumes with a square shoulder and an acuminate beak. The spike is awned, mid-dense and tapering. The kernel is red in color, elliptical to ovate, mid-size with rounded cheeks and a narrow and mid-deep crease. The brush has no collar and is medium in length. The Federal Grain Inspection Service judged Norm's kernel type as typical hard red spring wheat.

13D. Additional description of Norm--Quality for Bread-Making

Norm was tested as MN85324 for quality beginning in 1985, but comparable data with recommended cultivars in 1990 were obtained from variety trials in Minnesota from 1988-1990. These data for specific important quality traits with recommended check cultivars is given in Table 1. Norm was scored to have some promise in overall quality traits, not different from five other cultivars. It was judged to be somewhat lower in quality than Butte 86 and Stoa, but higher than Wheaton. Norm has somewhat lower protein than desired, but mixing properties were highly desirable with good loaf volume. These data were from small plot samples grown comparable with the other listed cultivars. Testing on the large mill and allowing milling and baking companies to evaluate the quality of new lines is necessary. Therefore, Norm, then MN85324, was entered in to the Spring Wheat Quality Program of the Wheat Quality Council. It was grown on 1/4 to 1/2 acre plots with a cultivar chosen as a quality standard, Len. Wheat samples were evaluated by 16 industry, university and USDA-ARS cooperator for quality. Results of these tests are given in Table 2. Norm was lower than Len for wheat and flour protein, although not significantly, but was significantly lower in bake absorption. Norm was significantly better for milling value at one location, was slightly lower in mixing requirements at one location but had better internal crumb color and slightly better grain and texture. OVERALL-- Norm was deem to be nonsignificantly poorer than Len at one location and nonsignifcantly better than Len at the other. Quality was obviously acceptable to the enclosed list of quality evaluators (Table 3) as indicated by the overall rating of equivalent to check.

Table 1. Mean quality data for Norm and recommended hard red spring wheat varieties grown in 18 environments in Minnesota from 1988 through 1990.

Variety	Protein	Flour yield	Flour water absorption	Mixogram[1] pattern	Loaf volume	Score[2]
	%	%	%	1-11	cc	1- 4
Norm	14.9	61	62	5.7	184	3.0
Stoa	15.4	62	62	5.7	191	3.4
Butte 86	15.4	62	62	4.3	180	3.3
Wheaton	14.9	61	62	4.8	189	2.6
Grandin	15.6	63	62	4.8	187	3.2
Prospect	15.1	59	59	2.7	192	2.8
Minnpro	16.4	60	65	5.7	194	3.2
Vance	15.2	62	60	3.7	173	2.9
Marshall	14.9	65	60	3.7	190	3.0
LSD .05	0.2	2	2	0.5	7	0.2

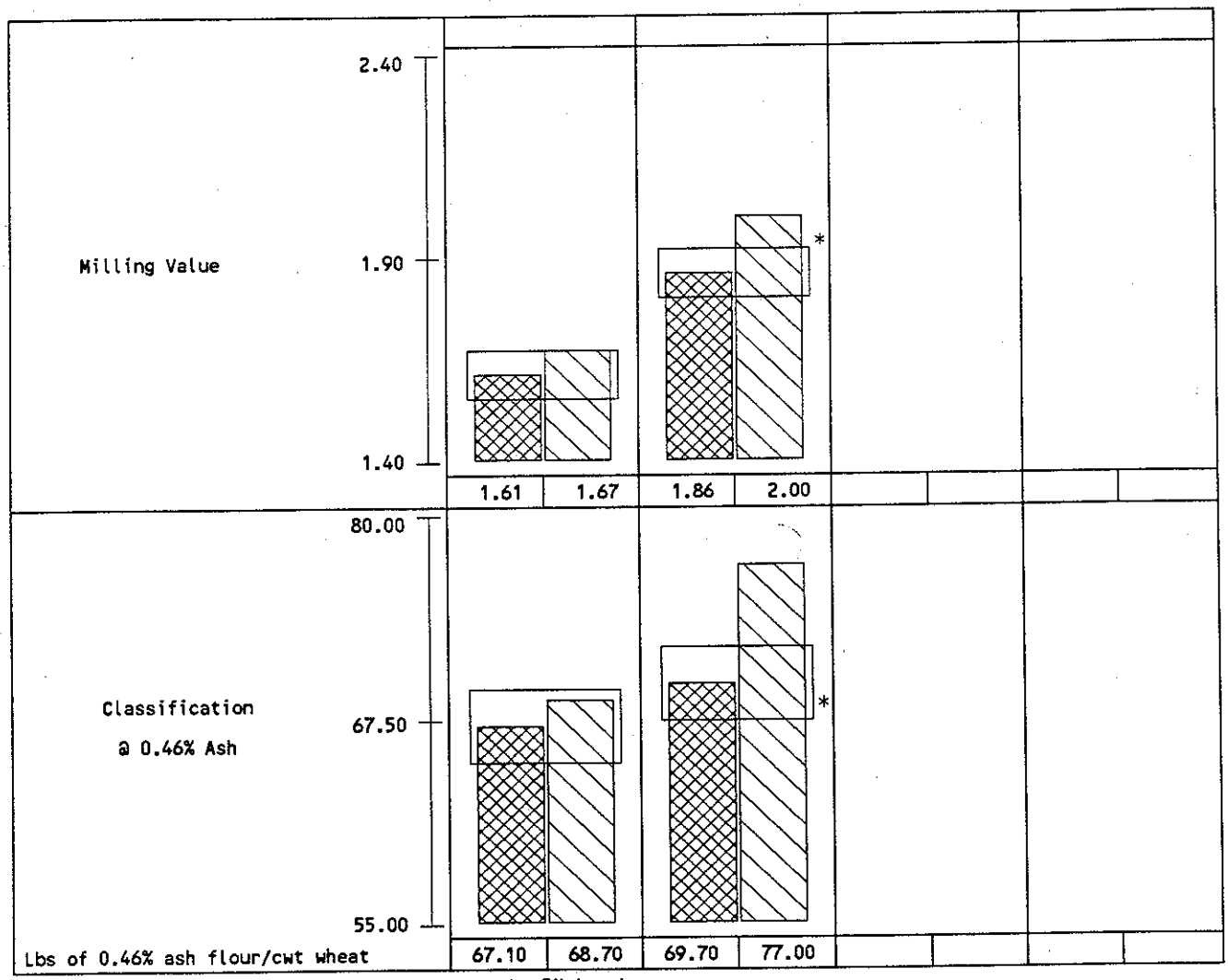
[1] 1=very weak; 11=extremely strong.

[2] Overall Score--1=no promise, 2=little promise, 3=some promise, 4=good promise.

TABLE 2. Milling Evaluation of 1990 Samples 9300073

Wheat Quality Council Tests. **MN85324** Norm Wheat(MN85324)

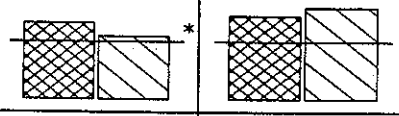
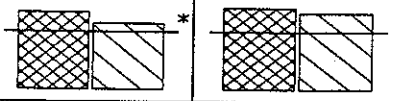
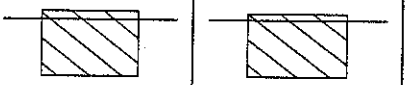
Location		Brookings		Crookston					
Variety		Check	B-8	Check	K-8	Check		Check	
1	Wheat Protein %	16.0	14.1	15.5	15.3				
2	Flour Protein %	14.8	13.2	14.8	14.5				
3	Test Weight lb/bu	56.6	56.3	61.2	60.3				
4	1000 Kernel Weight grams	23.2	25.3	29.4	28.2				
5	Large Kernel %	12	22	40	29				
6	Small Kernel %	10	7	4	6				
7	Hardness	78.0	65.0	91.0	71.0				
8	Wheat Ash %	1.90	1.76	1.73	1.79				
9	Wheat Falling No. sec	466	492	501	505				
10	Flour Extraction %	67.54	64.54	71.79	70.95				
11	Flour Ash %	0.46	0.43	0.46	0.40				
12	Lbs .46% Ash Flour / cwt wheat	67.10	68.70	69.70	77.00				
13	Farinograph: Absorption %	58.8	57.5	61.0	57.2				
	Arrival Time	2.2	1.8	2.3	3.3				
	Peak	5.5	4.2	7.7	12.8				
	Stability	12.0	11.0	25.5	34.2				
	M.T.I.	30	30	20	30				



* Difference is statistically significant at the 5% level.

Summary Results of Cooperating Bake Laboratories

TABLE 2 cont.

Location	Brookings		Crookston					
Variety (MN85324)	Check	B-8	Check	K-8	Check		Check	
14 Bake Absorption (14% M.B.)	62.5	61.5*	63.7	61.2*				
15 Loaf Volume (% of Check)	100.0	97.2	100.0	102.1				
16 Mixing Requirement (Very Long / Long / Medium / Short / Very Short)								
17 Dough Characteristics (Bucky-Tough / Strong-Elastic / Medium-Pliable / Mellow-Very Pliable / Weak-Short or Sticky)								
18 Mixing Tolerance (Much More Tolerance Than Check / More Tolerance Than Check / Tolerance Equivalent To Check / Less Tolerance Than Check / Much Less Tolerance Than Check)								
19 Internal Crumb Color (Much Brighter Than Check / Brighter Than Check / Equivalent To Check / Poorer Than Check / Much Poorer Than Check)								
Reason for ranking below check								
20 Internal Grain and Texture (Much Better Than Check / Better Than Check / Equivalent To Check / Poorer Than Check / Much Poorer Than Check)								
Reason for ranking below check								

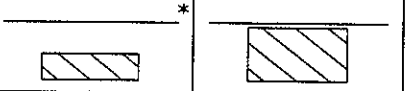
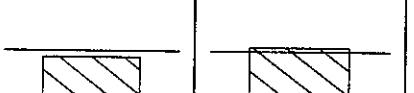
Categories 1-2: Protein (Much Better Than Check / Better Than Check / Equivalent To Check / Poorer Than Check / Much Poorer Than Check)					
Categories 3-13: Milling (Much Better Than Check / Better Than Check / Equivalent To Check / Poorer Than Check / Much Poorer Than Check)					
Categories 14-20: Baking (Much Better Than Check / Better Than Check / Equivalent To Check / Poorer Than Check / Much Poorer Than Check)					
Categories 1-20: Overall Comparison (Much Better Than Check / Better Than Check / Equivalent To Check / Poorer Than Check / Much Poorer Than Check)					

Table 3. List of Cooperators in 1990 for Wheat Quality Council

1990 WHEAT QUALITY PROGRAM REPORT

Introduction

The Wheat Quality testing program of the Spring Wheat Quality Advisory Council is designed to provide data concerning only the milling and baking properties of the samples grown and tested during the 1990 crop season.

The data in this report with respect to milling properties and farinograph data where developed under code and provided to the Council by the United States Department of Agriculture Hard Red Spring and Durum Wheat Quality Laboratory, Fargo, North Dakota.

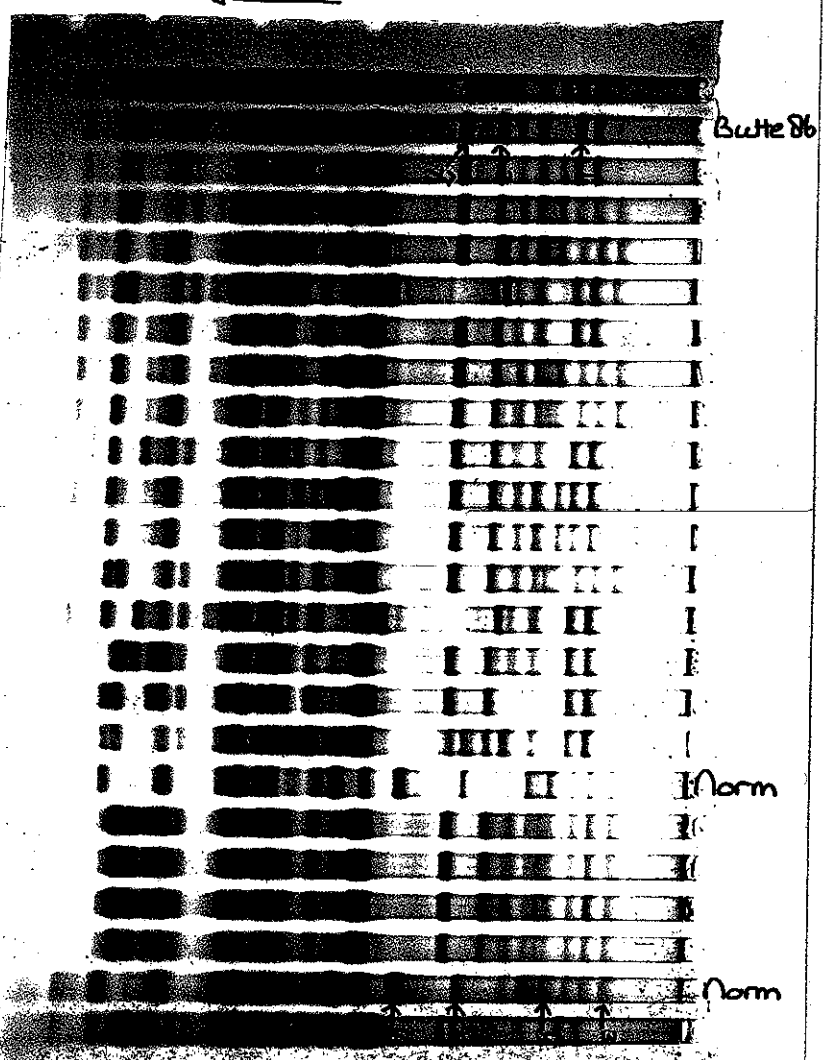
Baking data, under code, not disclosing the source of identity of the flour samples tested, were independently compiled and reported according to a uniform testing system by the following cooperating laboratories:

ADM Milling Company	Shawnee Mission, Kansas
Agripro Biosciences, Inc.	Berthoud, Colorado
Bay State Milling Company	Winona, Minnesota
Cargill Flour Milling	Albany, New York
Cargill Flour Milling	Wichita, Kansas
Cereal Food Processors, Inc.	Wichita, Kansas
ConAgra, Inc.	Omaha, Nebraska
General Mills, Inc.	Minneapolis, Minnesota
Grain Research Laboratory Canadian Grain Commission	Winnipeg, Canada
Montana State University Dept. of Plant & Soil Science	Bozeman, Montana
North Dakota State University Dept. of Cereal Science	Fargo, North Dakota
North Dakota Mill and Elevator	Grand Forks, ND
ATOCHEM Corporation	Buffalo, New York
The Pillsbury Company	St. Louis, Missouri
The Roman Meal Milling Company	Tacoma, Washington
USDA-ARS Hard Red Spring and Durum Wheat Quality Laboratory	Fargo, North Dakota

E. STATEMENT OF THE BASIS OF APPLICANT'S OWNERSHIP

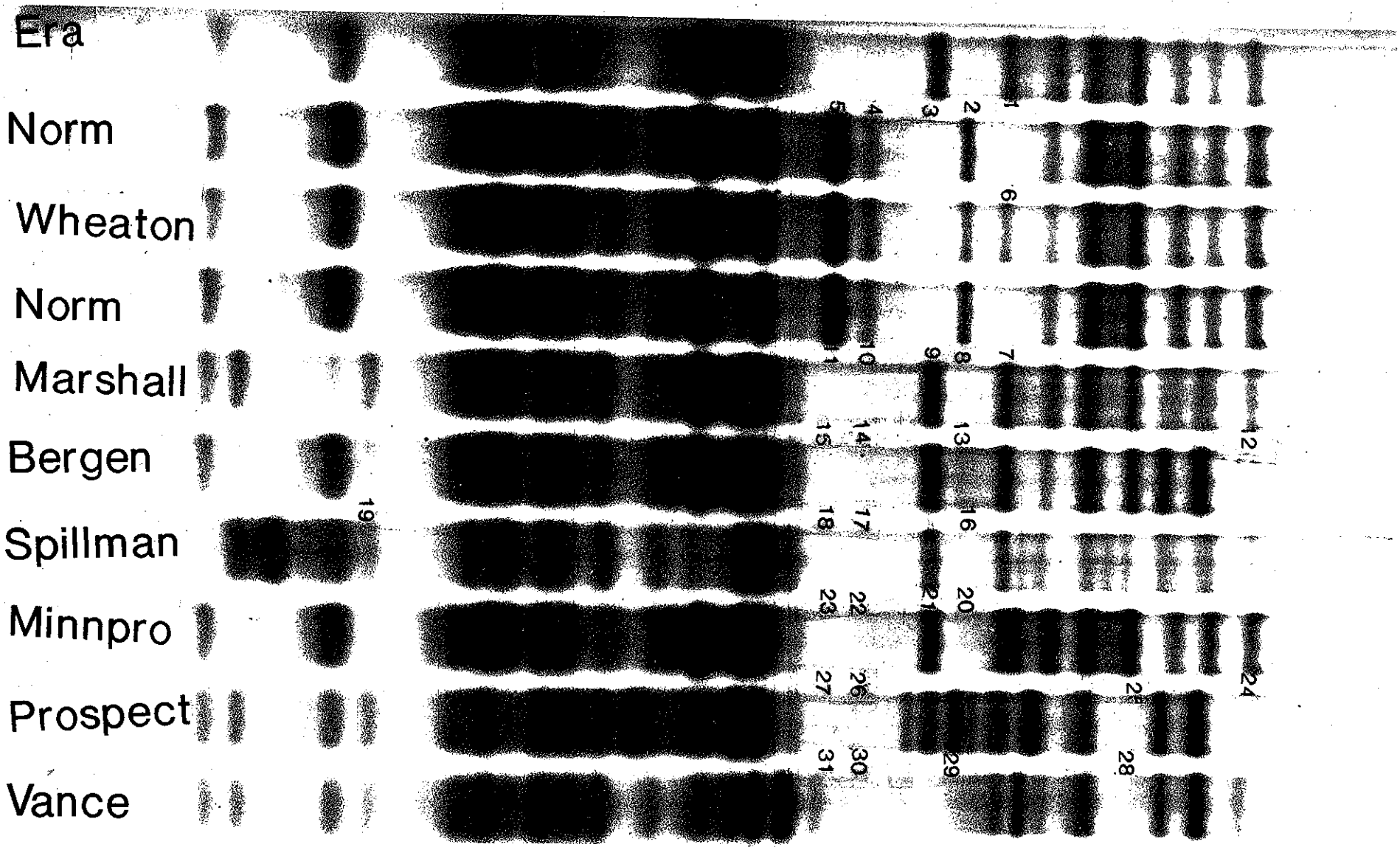
Both parents of Norm were Minnesota lines, which had not been releases for commercial production, from the joint USDA-ARS and Minnesota Agricultural Experiment Station spring wheat improvement program. The original cross, selection, and testing of MN85324 were conducted under direction of Dr. Robert H. Busch, Research Geneticist, Plant Science Unit, Agric. Research Service, USDA and employees of the University of Minnesota, Minnesota Agricultural Experiment Station. Complete ownership of this cultivar is claimed.

Figure 1



10/11/94-DR.
Busch's Samples
- #1616.

Figure 1. PAGE Gel Electrophoesis
NORM PVP



430073

TABLE 1. MN VARIETIAL TRIALS FOR PVP NORM DESCRIPTION 1989 90 92

VARIETY OR STATE NO.	YIELD BU/AC	TWT LB/BU	HD DAYS	HT CM	LD	DS
NO. LOCS:	19	19	17	18	11	1
NORM	57.1	58.7	24	80	2.1	4.2
MARSHALL	50.2	57.9	26	76	2.1	7.1
ERA	48.1	57.4	28	76	3.0	6.7
WHEATON	54.4	56.7	25	75	2.5	6.4
VANCE	51.3	57.1	26	78	2.4	7.0
MINNPRO	52.3	57.0	25	80	2.8	8.2
BERGEN	55.9	57.9	24	73	1.7	6.1
PROSPECT	54.8	58.9	24	80	2.1	7.3
MEANS:	53.0	57.7	25	77	2.3	6.6

TESTS	YIELD	TWT	HD	HT	LD
F-test:	8.1	10.9	26.3	11.5	3.7
LSD:	3.0	0.7	0.7	2.1	0.6
CV:	8.8	1.8	4.3	4.0	31.6